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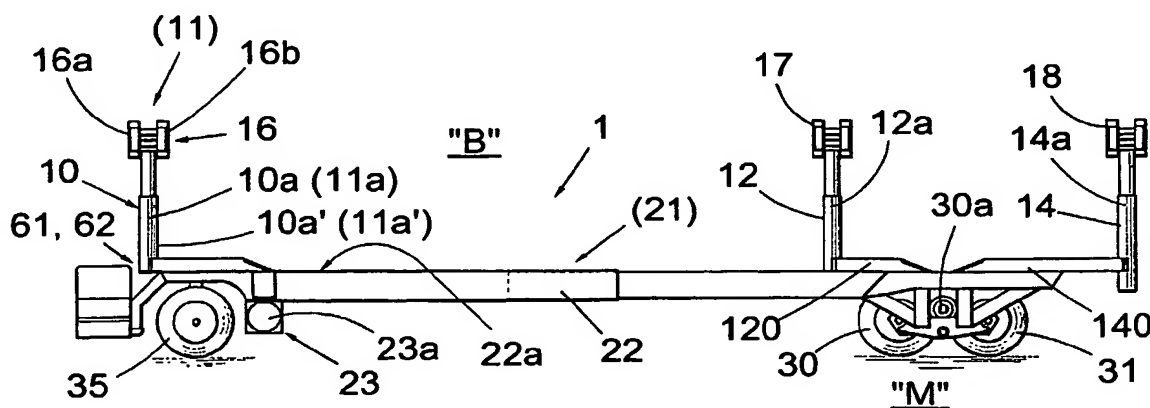
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(54) Title: A TRAILER FOR A BOAT



(57) Abstract: The present invention includes a trailer (1) adapted for a boat (B), having a chassis (2) shaped like a "U", provided with wheels and having a number of struts (10, 11; 12, 14) supported by the chassis and slings (16) or the like oriented between struts (10, 11) coordinated in pairs, which slings are intended to support said boat by directly or indirectly abutting against an outer surface of a hull belonging to the boat, said chassis (2) being formed by two flexurally rigid branches (21, 22), each one turnably related and connected with a connecting part (23) of a first end portion (22a) of the respective branch, and where at least selected struts (10, 11) consist of one hydraulically operating piston-cylinder arrangement (10a) each. Said piston-cylinder arrangements are hydraulically directly interconnected with each other and that this interconnection (61, 62) then is adapted to let hydraulic oil be distributed under an overpressure between the same arrangements (10a, 11a), in dependence of the rocking or rolling motion of the hull of the boat (B), preferably emanating from the twisting motion of the branches (21, 22) in relation to the ground (M) and the twisting motion thereof in relation to said connecting part (23).



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## A TRAILER FOR A BOAT.

### ***Technical Field of the Invention***

The present invention generally relates to a trailer adapted for a boat  
5 and more particularly to such a trailer that has a chassis shaped like a "U",  
provided with a number of wheels for a transport along a substratum and having a  
number of struts supported by the chassis and one or more slings, so called  
carrying slings, or the like oriented between struts coordinated in pairs, which  
slings are intended to support said boat by directly or indirectly abutting against an  
10 outer surface of a hull belonging to the boat.

More particularly the object of the matter is a trailer designed for  
boats, where said chassis is formed by two branches, the front and rear end  
portions of which are provided with wheels, where each one of the branches are  
turnably related and connected with a connecting part of a first, forward, end  
15 portion of the respective branch.

At least selected struts should here consist of hydraulically operating  
piston-cylinder arrangements, connected to a hydraulic-pressure-generating unit  
via actuator valves in order to be able to lift and lower the slings and thereby the  
hull of the boat by means of pressurised hydraulic oil.

20 The invention has been devised in order to be able to provide a trailer  
for boats, primarily engine-driven boats, having a buoyancy of, lets say, up to 500  
ton and where the subsequent description is relating to approx. 100 ton.

### ***Background of the Invention***

25 Methods and arrangements to construct trailers for boats are  
previously known in a number of different embodiments.

As an example of the background of the invention and the technical  
field to which the invention relates, it may be mentioned that, at least by public  
practice, previously a trailer adapted for a boat is known, having a chassis shaped  
30 like a "U", provided with wheels and having a number of vertically adjustable struts  
supported by the chassis and one or more carrying slings or the like oriented  
between struts coordinated in pairs, which slings are intended to let said boat be  
supported hanging in the same carrying slings by directly or indirectly abutting  
against an outer surface of a hull belonging to the boat.

Said chassis is formed by two flexurally rigid branches, each one being turnably related and connected with a connecting part of a first end portion of the respective branch and where at least one strut, out of a selected number of struts, consists of a hydraulically operating piston-cylinder arrangement, having the cylinder part facing towards and attached to the chassis and the piston part arranged movable up and down by means of a hydraulic oil supplied or drawn off via valve arrangements designed for this .

A trailer, of this category, has piston-cylinder arrangements coordinated in pairs, one pair for the stem of the boat, one or two pairs for the stern of the boat, and which are vertically adjustable in synchronism, in order to keep the hull of the boat hanging in carrying slings.

One or both of the astern carrying slings will come to carry the main part of the weight of the boat, with a larger friction effect activable between the carrying slings and the astern portion of the hull of the boat, while the forward carrying sling will come to carry a considerably lesser part of the weight of the boat, with a considerably lesser friction effect activable between the carrying sling and the forward portion of the hull of the boat.

This implies that a rocking or rolling of the hull of the boat, about a longitudinal axis assigned to the hull of the boat, caused primarily by a twisting of one branch relative the other branch in relation to the connecting part, will, by virtue of the lesser friction effect, create a relative motion between the forward carrying sling and the forward portion of the hull of the boat, a relative motion that normally may inflict larger or smaller damages to the forward portion of the hull of the boat as well as normally may inflict wear of the carrying sling.

### ***Description of the Present Invention***

#### **Technical Problems**

Taken into consideration the circumstance that the technical deliberations that a professional skilled in the appurtenant technical field has to do to be able to offer a solution of one or more technical problems encountered, is on one hand initially required an insight of the measures and/or the sequence of measures that are to be taken and, on the other hand, a necessary choice of the one or several means that are required, owing to this the subsequent technical

problems will be relevant at the creation of the subject matter of the present of invention.

In view of the standpoint of the prior art, such as it has been described above, therefore it should be appreciated as a technical problem to be able to understand the significance of and the advantages associated with – at a trailer adapted for a boat, having a chassis shaped like a "U", provided with wheels and having a number of struts supported by the chassis and one or more slings, so called carrying slings, or the like oriented between struts coordinated in pairs, which slings are intended to support said boat by directly or indirectly abutting against an outer surface of a hull belonging to the boat, said chassis being formed by two flexurally rigid branches, each one being turnably related and connected with a connecting part of a first end portion of the respective branch and where at least selected struts should consist of a hydraulically operating piston-cylinder arrangement – being able to offer a construction that entirely can eliminate the drawbacks that has been described above in conjunction with the prior art.

Likewise, there is a technical problem to be able to appreciate the significance of and the advantages associated with the utilisation of a hydraulic coupling arrangement, where the struts, belonging to the first, forward, end portion of the branches, consist of at least one piston-cylinder arrangement assigned to the respective branch, that these are coordinated by means of at least one sling or the like, adapted to being able to support a forward portion assigned to the hull of the boat, and that these piston-cylinder arrangements are hydraulically directly interconnected with each other, such that, while a selected hydraulic pressure keep the boat hanging, one of the arrangements can be elevated while the other arrangement can be lowered and vice versa, all in dependence of the rocking or rolling of the hull of the boat, by means of letting hydraulic oil, under the chosen pressure, be conveyed, via a line, from one of the piston-cylinder arrangements to the other and vice versa.

There is a technical problem to be able to appreciate the significance of and the advantages associated with then allowing this hydraulic interconnection to be adapted to, via a well adapted hydraulic oil line, adaptedly fast being able to apportion hydraulic oil between the same arrangements, primarily dependent on the rocking or rolling motion of the hull of the boat in relation to the chassis, while specially taking into consideration the motions that are to be related to the motions

of the branches in relation to said connecting part, all while the trailer is moved along an uneven substratum.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that the forwardly arranged struts should be coordinated in pairs and oriented to or at least adjacent to each one of the first, forward, end portion of the branches.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that the forwardly arranged struts, in the form of piston-cylinder arrangements, should, what concerns the cylinder parts, be hydraulically directly interconnected to each other.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that the astern arranged struts should be coordinated in pairs and oriented to each one of the second end portion of the branches.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that astern arranged struts, in the form of piston-cylinder arrangements, for one branch each should be able to be hydraulically directly interconnected to each other via valve arrangements.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that forwardly arranged struts coordinated in pairs, in the form of piston-cylinder arrangements, should be connected to a first hydraulic-pressure-generating arrangement.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that astern arranged struts coordinated in pairs, in the form of piston-cylinder arrangements, one pair for one branch each, should be connected via valve arrangements to a second hydraulic-pressure-generating arrangement.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that astern arranged additional struts coordinated in pairs, in the form of piston-cylinder arrangements, one pair for one branch each, should be connected via valve arrangements to a third hydraulic-pressure-generating arrangement.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that the respective flexurally rigid branch at least should be able to have two parts, displaceably related to each other and attachable to each other in predetermined or arbitrary set positions.

There is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that strut-assigned piston-cylinder arrangements for the second or astern end portion of one of the branches should via valve arrangement be able to be directly hydraulically connected.

There is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that strut-assigned piston-cylinder arrangements for the second or astern end portion of the other branch should via valve arrangement be able to be directly hydraulically connected.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that all struts should be turnably mounted to the appurtenant branch thereof via a horizontally oriented arm for an automatic adaptation to the width of the hull of the boat.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that each selected strut by the twisting motion thereof should be adapted to be able to assume any set position between an end position at one side, the inside, of the branch and an end position at the other side, the outside, of the branch.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that the mounting of the arm in the first, forward, end portion of the branch should be oriented at or adjacent to the connecting part of the first end portions of the branches.

There is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that a pair of wheels assigned to the second or astern end portion of each branch should be assigned a bogie.

There is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that branch-assigned wheels necessary for the steering of the chassis should be arranged in front of, as seen in the direction of transport, the connecting part of the first, forward, end portions of the branches.

There is a technical problem to be able to appreciate the significance of and the advantages associated with being able to create such provisions at a trailer for boats of the above-mentioned nature that the first end portion of the respective branch should have a sleeve-shaped bearing member, assigned a length within a range of 0,1 to 0,4, especially within a range of 0,2 to 0,3, of the length assigned to the connecting part of the first end portion of the respective branch.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that among selected struts assigned to the second, astern, end area, two should be coordinated and turnably mounted to the appurtenant branch thereof via one horizontally oriented arm each.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that each such strut should be adapted to be able to assume any set position between an end position at one side, the inside, of the branch and an end position at the other side, the outside, of the branch.



In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with allowing to create such provisions at a trailer for boats of the above-mentioned nature that the mountings of the arms in the second, astern, end portion of the branch should be oriented at or adjacent to the pair of wheels assigned to the second end portion of the branches.

There is a technical problem to be able to appreciate the significance of and the advantages associated with, via the connecting part, in the form of a round shaft, being able to adjust the distance between the branches in order to fit the width of a transported hull of a boat.

In that connection, it is a technical problem to be able to appreciate the significance of and the advantages associated with creating such provisions at a trailer for boats of the above-mentioned nature that said sleeve-shaped bearing members become adapted to directly or indirectly being able to interact with each other end against end and turnably, in order to thereby allow the branches to assume a position adapted for transportation without boat or a boat of small width (transport position to and fro place of service).

#### The Solution

In that connection, the present invention proceeds from the known technique at a trailer for a boat referred to in the introduction, having a chassis shaped like a "U", provided with wheels and having a number of struts supported by the chassis and one or more slings or the like oriented between struts coordinated in pairs, which slings are intended to support said boat by directly or indirectly abutting against an outer surface of a hull belonging to the boat.

Said chassis is formed by two flexurally rigid branches, each one turnably related and connected with a connecting part of a first end portion of the respective branch and where at least selected struts consist of a hydraulically operating piston-cylinder arrangement.

Now, in order to be able to solve one or more of the above-mentioned technical problems, at such a trailer the present invention teaches that the struts, belonging to the first end portions of the branches, should consist of at least one piston-cylinder arrangement assigned to the respective branch, where the same

are coordinated by means of at least one sling or the like, adapted to a forward portion assigned to the hull of the boat.

Then, these piston-cylinder arrangements should be hydraulically directly interconnected with each other and that this interconnection then is adapted to let hydraulic oil be distributed under a selected overpressure between the same arrangements in dependence of the rocking or rolling motion of the hull of the boat in relation to the chassis, especially emanating from the motion of the flexurally rigid branches in relation to each other and in relation to said connecting part.

As proposed embodiments, being within the scope of the fundamental idea of the present invention, is taught that the forwardly arranged struts should be coordinated in pairs, one to one each of the first end portions of the branches

Further, it is taught that the forwardly arranged struts, in the form of piston-cylinder arrangements, should be hydraulically directly (without valve arrangement) interconnected to each other.

Further, it is taught that the astern arranged struts should be oriented to and coordinated in pairs to each of the second end portions of the branches.

The invention suggests that the astern arranged struts, in the form of piston-cylinder arrangements, for one branch each should, via valve arrangement, be able to be hydraulically directly interconnected to each other.

In addition, it is taught that forwardly arranged struts coordinated in pairs, in the form of piston-cylinder arrangements should, via a valve arrangement, be connected to a first hydraulic-pressure-generating arrangement.

Further, it is taught that astern arranged struts coordinated in pairs, in the form of piston-cylinder arrangements, one for one branch each should, via a valve arrangement, be connected to a second hydraulic-pressure-generating arrangement.

Furthermore, it is taught that astern arranged additional struts coordinated in pairs, in the form of piston-cylinder arrangements, one for one branch each should, via a valve arrangement, be connected to a third hydraulic-pressure-generating arrangement.

The respective branch should advantageously have at least two parts, displaceably related to each other and attachable to each other at a predetermined or an arbitrarily selected set position.

Further, it is taught that strut-assigned piston-cylinder arrangements, for the second or astern end portion of one of the branches should, via valve arrangement, be able to be directly hydraulically interconnected.

5     Strut-assigned piston-cylinder arrangements for the second or astern end portion of the other branch may, also via valve arrangement, advantageously be directly hydraulically interconnected.

10     Selected struts, like the total lot, are turnably mounted to the appurtenant branch thereof via a horizontally oriented arm, whereby each selected strut may be adapted to be able to assume any arbitrary position between an end position at one side, the inside, of the branch and an end position at the other side, the outside, of the branch.

Further, it is taught that the mounting of the arm in the first, forward, end portion of the branch could be oriented at or adjacent to the connecting part of the first end portion of the branches.

15     Further, it is taught that branch-assigned wheels necessary for the steering of the chassis should be arranged forwardly to the connecting part of the first, forward, end portions of the branches.

20     Specially, it is taught that the first end portion of the respective branch should have a sleeve-shaped bearing member, assigned a length within a range of 0,1 to 0,4, especially within a range of 0,2 to 0,3, of the length assigned to the connecting part of the first end portion of the respective branch.

Further, it is taught that among a plurality of selected struts assigned to the second, astern, end area, at least two coordinated should be turnably mounted to the appurtenant branch thereof via a horizontally oriented arm each.

25     Then, each such strut may be adapted to be able to assume any arbitrary position between an end position at one side, the inside, of the branch and an end position at the other side, the outside, of the branch.

30     The mountings of the arms in the second, astern, end portion of the branch should be oriented at or adjacent to the pair of wheels assigned to the second end portion of the branch.

Further, it is taught that said sleeve-shaped bearing members should be adapted to directly or indirectly (via the connecting part) be able to interact with each other, in order to allow the branches assume a position adapted for transportation without boat.

**Advantages**

The advantages that first of all are to be appreciated as characteristic of the present invention and the particular significant features taught thereby is that in this way provisions have been created to be able to transport a boat on a trailer, having movable or turnable mountings of two flexurally rigid branches to a connecting part of the branches, and by a special hydraulic direct interconnection of forward struts, in the form of piston-cylinder arrangements, the rocking or rolling movements of the boat, inter alia by virtue of the twisting motions of the branches dependent on irregularities of the substratum or the ground, can be allowed without any relative motion between the forward part section of the hull of the boat and a carrying sling or the like oriented there.

What first of all is to be appreciated as characteristic of the present invention is stated in the subsequent characterizing clause of claim 1.

**Brief Description of the Drawings**

Two embodiments proposed at present, having the significant features associated with the invention associated, will now for the purpose of exemplifying be described in more detail with reference to appended drawing,

where:

- Figure 1 in a side view shows a first embodiment of a trailer designed for a boat, which trailer is adapted for a boat having the buoyancy of approx. 100 ton,
- Figure 2 in a horizontal view shows the trailer according to figure 1,
- Figure 3 in a frontal view shows the trailer according to figure 1,
- Figure 4 in a horizontal view shows the trailer according to Figure 2 in a joined position intended for transportation without boat or a boat of small width,
- Figure 5 in a side view shows a second embodiment of a trailer designed for a boat, having two forward struts assigned one branch each,
- Figure 6 shows a hydraulic coupling arrangement for utilized struts in the form of hydraulic piston-cylinder arrangements, according

to the embodiment shown in figure 2 and  
Figure 7 schematically shows a hydraulic-pressure-generating unit in order to, via valve arrangement, be able to supply different arrays of struts and piston-cylinder arrangements with pressurised hydraulic oil and via the same valve arrangement being able to evacuate supplied hydraulic oil.

### ***Description of Embodiment Presently Proposed***

By way of introduction, then it has to be emphasised that in the subsequent description of an embodiment presently proposed, which has the  
5 significant features associated with the invention and which is elucidated by the displayed figures in the subsequent drawings, we have had technical terms and a particular terminology chosen with the intention, in that connection, to primarily have the fundamental idea of the invention made clear.

However, in this context it should be taken into consideration that  
10 expressions chosen here are not to be perceived as limited merely to the terms employed and chosen here, but it should be implicit that each term chosen in this way should be interpreted such that it in addition includes all technical equivalents that functions in the same or substantially the same way in order to thereby be able to achieve the same or substantially the same intention and/or technical  
15 effect.

With reference to figure 1, there the fundamental conditions of the present invention are schematically shown and where they are generally concretised by the significant features associated with the invention, by an embodiment presently proposed and shown in more detail in the subsequent in  
20 appended drawings and by two embodiments disclosed in more detail in the subsequent description.

Accordingly, from the figures 1 to 4 the fundamental conditions for a trailer 1 adapted for a boat "B" is apparent, the trailer having (specially shown in figure 2 and figure 4) a "U"-shaped chassis 2 provided with wheels and having a  
25 number of struts 10, 11; 12, 13; 14, 15 supported by the parallel flexurally rigid branches 21, 22 of the chassis 2 and oriented sling 16, 17, 18 or the like between struts 10, 11; 12, 13; 14, 15 coordinated in pairs and assigned to the respective branch 21, 22, which slings are intended to suspend said boat "B" by directly or

indirectly abutting against an outer surface of a hull belonging to the boat, said chassis 2 being formed by said two flexurally rigid branches 21, 22, each one turnably related to and connected with a connecting part 23 of a first, forward, end portion 21a, 22a of the respective branch, in the form of a cylindrical shaft, and where at least selected struts consist of a hydraulically operating piston-cylinder arrangement, assigned the reference designations 10a, 11a; 12a, 13a; 14a, 15a.

The subsequent description will assign the branches a first, a "forward", end portion 21a, 22a and a second, an "astern", end portion 21b, 22b, in order to thereby indicate the boat-related positioning of the end portions belonging to the branches.

The struts 10, 11 belonging to the first, forward, the portions 21a, 22a of the branches 21, 22 consist of piston-cylinder arrangement 10a, 11a assigned to at least the respective branch 21, 22 and that the same arrangements are coordinated by means of at least one sling 16 (or at heavier boats double slings 16a, 16b) or the like, here illustrated as a carrying sling 16, adapted for a forward portion belonging to the hull of the boat.

Said piston-cylinder arrangements 10a, 11a are hydraulically directly interconnected (according to figure 6) to each other via a line 61 and that this interconnection then becomes adapted to being able to distribute hydraulic oil under an conditioned overpressure between the same arrangements 10a, 11a in dependence of the rocking or rolling motion of the hull of the boat from the twisting motion of the branches 21, 22 in relation to each other and in relation to said connecting part 23 and where this rocking or rolling motion primarily is to be related to irregularities in the substratum or ground "M", against which wheels 30, 31; 32, 33, assigned one second, astern, end portion 21b, 22b each of one branch each, will rest.

From the figures it is apparent that the forwardly arranged struts 10, 11 are oriented or coordinated in pairs to each of the first end portions 21a, 22a of the branches.

The forwardly arranged struts 10, 11, illustrated in the form of piston-cylinder arrangements 10a, 11a, having the cylinder parts 10a', 11a' thereof attached to the respective branch, are hydraulically directly interconnected to each other via hydraulic lines 61, 62 and a valve arrangement.

The embodiment according to the figures 1 to 4 shows that the astern arranged struts 12, 13; 14, 15 are oriented in pairs 12, 14; 13, 15 and coordinated to one each of the second end portion 21b, 22b of the branches.

5 The astern arranged struts 12, 14; 13, 15, also here in the form of piston-cylinder arrangements 12a, 14a; 13a, 15a, for one branch 21, 22 each, may be hydraulically directly interconnected to each other via valve arrangements.

The line 63 is connected to the cylinder part 12a', the line 64 is connected to the cylinder part 14a' and these are supplied with pressurised hydraulic oil via valve arrangements.

10 The line 65 is connected to the cylinder part 13a', the line 66 is connected to the cylinder part 15a' and these are supplied with pressurised hydraulic oil via valve arrangements.

The forwardly arranged struts 10, 11 related or coordinated in pairs, also here in the form of piston-cylinder arrangements, should via the line 62 and a valve arrangement be connected to a first hydraulic-pressure-generating arrangement 71 (according to figure 7).

20 The astern arranged struts 12, 14 related in pairs, also here in the form of piston-cylinder arrangements 12a, 14a, may via lines 63 and 64 and a valve arrangement be connected to a second hydraulic-pressure-generating arrangement 72.

Astern arranged additional struts 13, 15 related in pairs, also here in the form of piston-cylinder arrangements 12a, 14a, may via lines 65, 66 and a valve arrangement be connected to a third hydraulic-pressure-generating arrangement 73.

25 For a person skilled in the art it is evident that, via the valve arrangements that control the hydraulic pressure to and the coordination between arrangements 12a, 14a; 13a, 15a, a plurality of different interconnections, series connections and/or parallel connections may be realised depending upon demands and desired results.

30 In order to be able to offer an adaptation of the length of the trailer to the length of the hull of the boat it is taught that the respective branch 21, 22 at least should have two parts 121a, 121b and 122a, 122b, respectively, displaceably related in to and out of each other and attachable to each other at a predetermined

number of different or arbitrary positions, in order to, in that way, adapt the wheelbase to the length of the boat, weight distribution, etc.

Strut-assigned piston-cylinder arrangements 13a, 15a for the second or astern end portion 21b of one of the branches 21 may thus via valve arrangement be directly hydraulically interconnected to each other.

Strut-assigned piston-cylinder arrangements 12a, 14a for the second or astern end portion 22b of the other branch 22 may thus via valve arrangement also be directly hydraulically interconnected to each other.

All struts should be turnably mounted to the appurtenant branch thereof 21, 22 via one horizontally oriented arm each, such as the arms 110, 100, for the struts 10, 11.

One or more of the struts selected in this way are adapted to be able to assume any selected set position between two chosen end positions, one end position at one side, the inside, of the branch and one end position at the other side, the outside, of the branch, which end positions are indicated by means of dashed lines.

More particularly the object is to allow the mounting of the arm 100, 110 in the first, forward, end portion 21a, 22a of the branch to be oriented at or adjacent to the connecting part 23 of the first end portions of the branches.

The second or astern end portion of each branch is assigned a pair of wheels 30, 31; 32, 33 and said pairs of wheels (30, 31) are assigned a bogie or bogie structured.

Then, here it is suggested that one of a hydraulic motor-driven driving gear 30a should, for a reel drive, be arranged between the wheels 30, 31 within the pair of wheels and pressed against the upper portion of the same wheels. The rest of the pairs of wheels are provided with similar hydraulic motor and driving gear.

Further, it is suggested that branch-assigned, pairs of wheels 35, 36 required for a steering of the chassis should be arranged forwardly to the connecting part 23 of the first, forward, end portions of the branches.

More particularly, concerning the turnable mounting, it is suggested that the first end portion 21a, 22a of the respective branch 21, 22 should have a sleeve-shaped bearing member 121a, 122a.



Said bearing members, embedded in a unit of square cross-section, should then interact with a round shaft 23a and be assigned a length "L1" within a range of 0,1 to 0,4, especially within a range of 0,2 to 0,3 of the length "L" assigned to the connecting part 23 of the first end portions of the respective

5 branch.

Selected struts 12, 14, assigned to the second, astern, end area 22b, should at least, two by two, be turnably mounted to the appurtenant branch thereof via one horizontally oriented arm 120, 140 each.

10 In that connection, each such strut is adapted to be able to assume any arbitrarily intermediate position between an end position 140' at one side, the inside, of the branch or an end position at the other side 140'', the outside, of the branch, according to the dashed positions according to figure 2.

The mountings of the arms in the second, astern, end portion of the branch are oriented and coordinated at or adjacent to the pair of wheels 30, 31  
15 assigned to the second end portion of the branches.

Said sleeve-shaped bearing members 121a, 122a are adapted to be able to assume an arbitrary position along the shaft 23a in order to, in that connection, adapt the distance between the branches 21, 22 to the width of the transported boat.

20 According to figure 4, said sleeve-shaped bearing members 121a, 122a are here adapted in such a way that they directly or indirectly should be able to interact with each other at a twisting motion, in order to allow for the branches 21, 22 to assume a position oriented close to each other and adapted for a road transport without boat or a boat of small width. Here, the branches 21, 22 are  
25 illustrated in a fully joined position.

Figure 5 shows an embodiment, resembling the one in figure 1, where the forward struts 10, 11 have been completed with additional struts 10', 11', also these (such as 10') interacting with the branch 22 via an arm 100'.

Of course, the invention is not limited to the above embodiment given  
30 as an example but may be subject to modifications within the scope of the general idea of the invention illustrated in the subsequent claims.

In particular, it should be taken into consideration that each unit shown may be combined with any other unit shown within the scope in order to be able to attain desired technical function.

## CLAIMS

1. Trailer (1) adapted for a boat (B), having a chassis (2) shaped like a "U", provided with wheels and having a number of struts (10-15) supported by the chassis and one or more slings or the like oriented between struts (10,11) coordinated in pairs, which slings are intended to support said boat (B) by directly or indirectly abutting against an outer surface of a hull belonging to the boat, said chassis (2) being formed by two branches (21, 22), each one turnably related and connected with a connecting part (23) of first end portions of the respective branch, and where at least selected struts (10,11) consist of a hydraulically operating piston-cylinder arrangement (10a, 11a), **characterized in that** the struts (10, 11), belonging to the first end portions (21a, 22a) of the branches, consist of at least one piston-cylinder arrangement (10a, 11a) assigned to the respective branch, that these are coordinated by means of at least one sling (16) or the like, adapted for an interaction with a forward portion assigned to the hull of the boat, that piston-cylinder arrangements (10a, 11a) coordinated in pairs are hydraulically directly interconnected with each other and that this interconnection then is adapted to let hydraulic oil be distributed under an overpressure between the same arrangements, in dependence of the rocking or rolling motion of the hull of the boat, preferably emanating from the twisting motion of the branches (21, 22) in relation to said connecting part (23).
2. Trailer according to claim 1, **characterized in that** forwardly arranged struts (10, 10') are oriented in pairs and coordinated to each one of the first end portion (22a) of the branches.
3. Trailer according to claim 2, **characterized in that** the forwardly arranged struts, in the form of piston-cylinder arrangements, are hydraulically directly interconnected (61, 62) to each other.
4. Trailer according to claim 1, **characterized in that** astern arranged struts (12, 14; 13, 15) are oriented in pairs to each one of the second end portions (22b, 21b) of the branches.

5. Trailer according to claim 4, **characterized in that** the astern arranged struts (12, 14), in the form of piston-cylinder arrangements, for one branch each (22) are hydraulically interconnected to each other via valve arrangements.

5 6. Trailer according to claim 1, **characterized in that** forwardly arranged struts coordinated in pairs, in the form of piston-cylinder-arrangements, are connected to a first hydraulic-pressure-generating arrangement (71) via a valve arrangement.

10 7. Trailer according to claim 1, **characterized in that** astern arranged struts coordinated in pairs, in the form of piston-cylinder arrangements, for one branch, are connected to a second hydraulic-pressure-generating arrangement (72) via a valve arrangement .

15 8. Trailer according to claim 1, **characterized in that** astern arranged additional struts related in pairs, in the form of piston-cylinder arrangements, one for one branch each, are connected to a third hydraulic-pressure-generating arrangement (73) via a valve arrangement.

20 9. Trailer according to claim 1, **characterized in that** respective branch has at least two parts, displaceably related to each other and attachable to each other at a number of predetermined or arbitrary set positions.

25 10. Trailer according to claim 1, **characterized in that** strut-assigned piston-cylinder arrangements for the second or astern end portion of one of the branches are directly hydraulically interconnected via a valve arrangement.

11. Trailer according to claim 1, **characterized in that** strut-assigned piston-cylinder arrangements for the second or astern end portion of the other branch are directly hydraulically interconnected via a valve arrangement.

30

12. Trailer according to claim 1, **characterized in that** all struts are turnably mounted to the appurtenant branch thereof via a horizontally oriented arm.

13. Trailer according to claim 12, **characterized in that** each selected strut is adapted to be able to assume any arbitrary intermediate position between an end position at one side, the inside, of the branch and an end position at the other side, the outside, of the branch.

5

14. Trailer according to claim 1, 12 or 13, **characterized in that** the mounting of the arm in the first, forward, end portion of the branch is oriented at or adjacent to the connecting part of the first end portion of said branch

10

15. Trailer according to claim 1, **characterized in that** a pair of wheels assigned to the second or astern end portion of each branch are assigned a bogie.

16. Trailer according to claim 14, **characterized in that** a driving gear driven by a motor is arranged between the wheels within the pair of wheels.

15

17. Trailer according to claim 1, **characterized in that** branch-assigned wheels necessary for the steering of the chassis are arranged forwardly to the connecting part of the first, forward, end portions of the branches.

20

18. Trailer according to claim 1, **characterized in that** the first end portion of the respective branch has a sleeve-shaped bearing member, assigned a length (L1) within a range of 0,1 to 0,4, especially within a range of 0,2 to 0,3, of the length (L) assigned to the connecting part of the first end portion of the respective branch.

25

19. Trailer according to claim 1, **characterized in that** among selected struts assigned to the second, astern, end area, two are turnably mounted to the appurtenant branch thereof via one horizontally oriented arm each.

30

20. Trailer according to claim 19, **characterized in that** each such strut is adapted to be able to assume any arbitrary intermediate position between an end position at one side, the inside, of the branch and an end position at the other side, the outside, of the branch.

21. Trailer according to claim 19 or 20, **characterized in that** the mountings of the arms in the second, astern, end portion of the branch are oriented at or adjacent to the pair of wheels assigned to the second end portion of the branch.

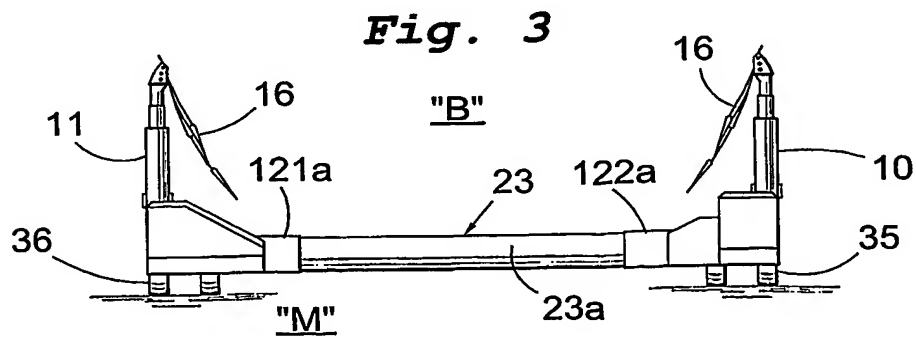
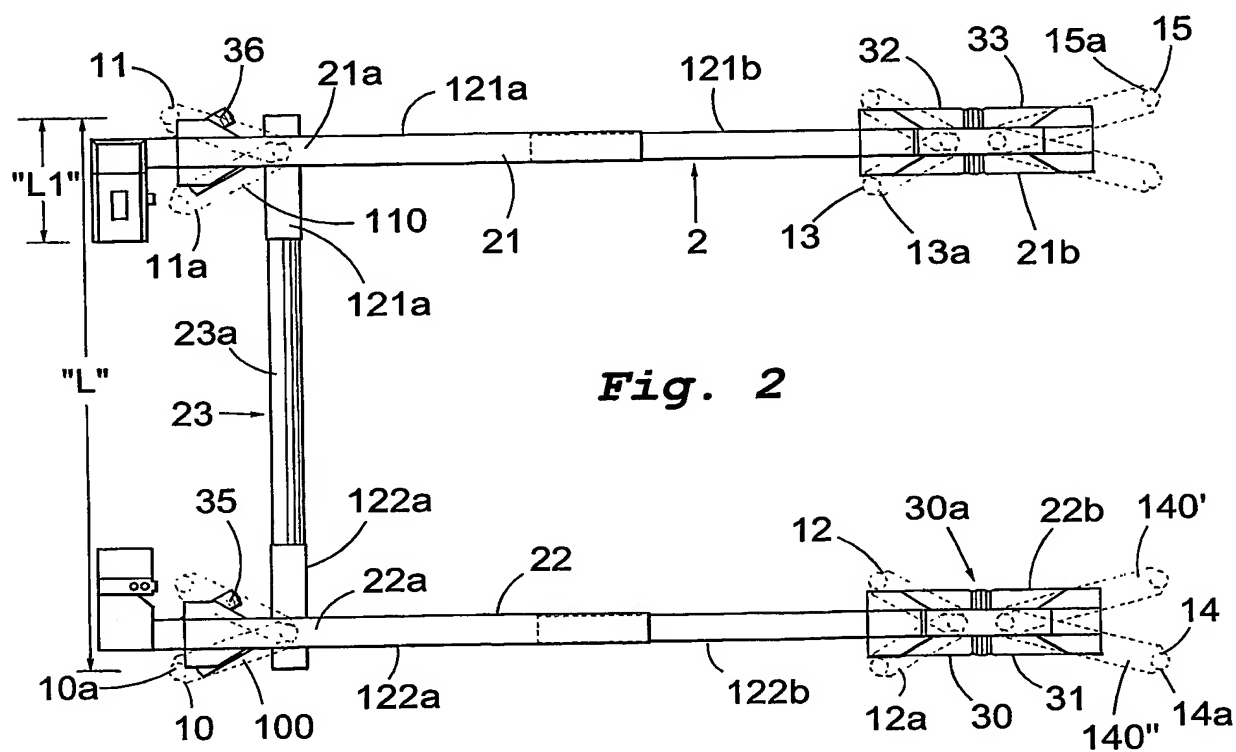
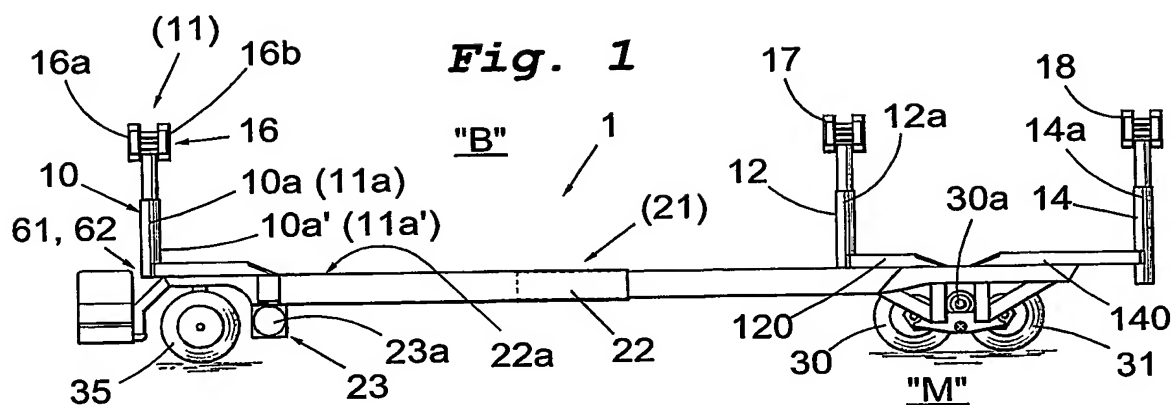
5 22. Trailer according to claim 18, **characterized in that** said sleeve-shaped bearing members are adapted to directly or indirectly interact with each other, in order to allow the branches to assume a position adapted for a transportation without boat or a transportation of a slender boat.

10 23. Trailer according to claim 22, **characterized in that** the end portions of the bearing members are attached to each other so as to have a relative twisting motion.

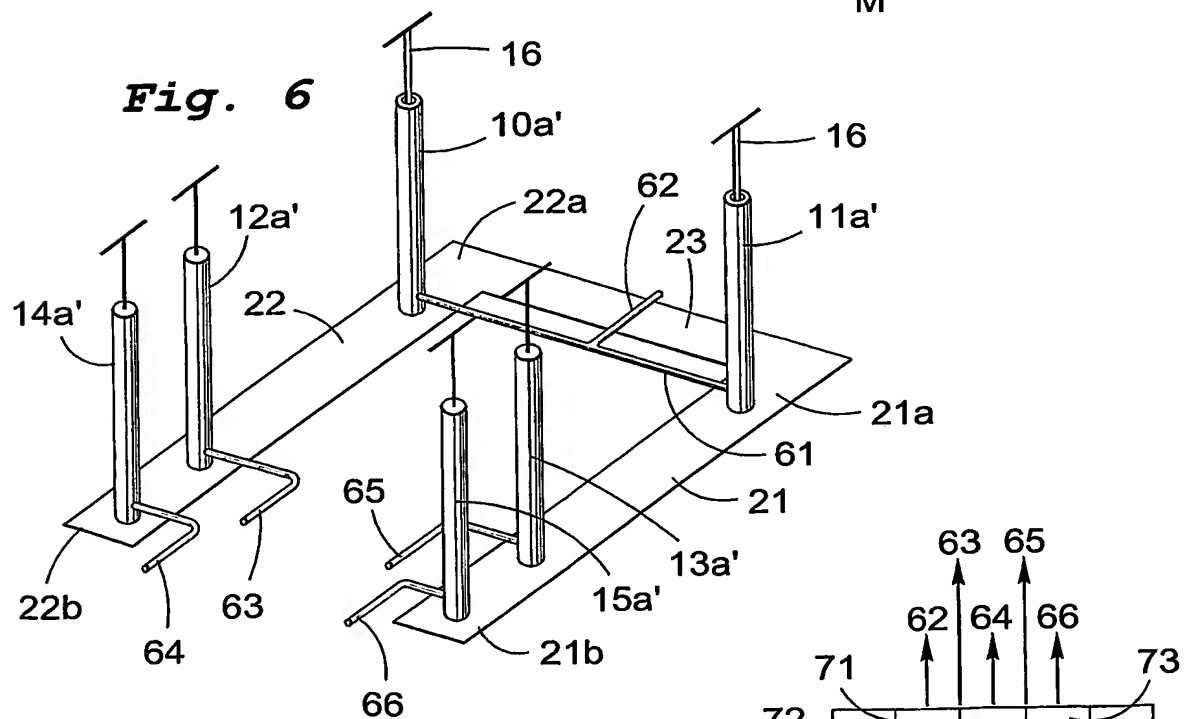
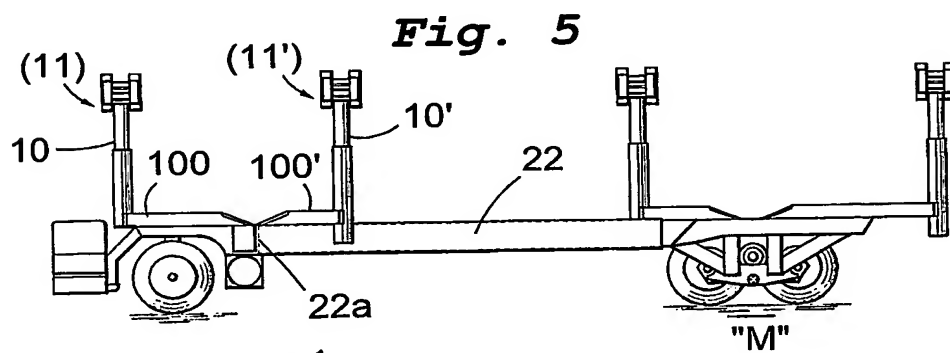
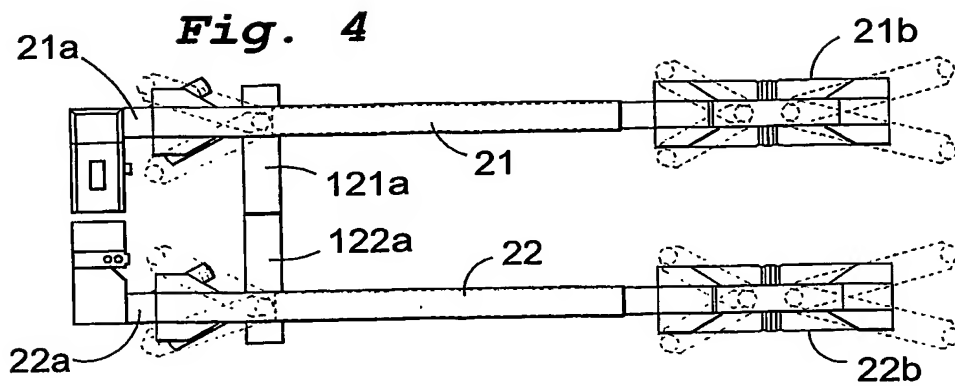
15 24. Trailer according to claim 22, **characterized in that** the bearing members are displaceably arranged along said connecting part, for an adjustment of the distance between the branches.

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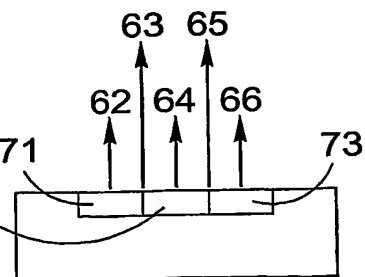
1/2



2/2



**Fig. 7**



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00354

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B60P 3/10, B63C 3/12

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B60P, B63C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9954165 A1 (GRANLIND), 28 October 1999 (28.10.99) --	1-24
A	EP 0566545 A2 (ALTO SERVICE SRL), 20 October 1993 (20.10.93) --	1-24
A	WO 8700807 A1 (GLEONEC), 12 February 1987 (12.02.87) -- -----	1-24

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

29/04/03

International application No.

PCT/SE 03/00354

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